Diabetes Risk Assessment, Glycemic Control, and Adherence to Standards of Care in Adults Experiencing Homelessness

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Conflict of interest

The authors declare that there is no conflict of interest.
Objectives

Upon completion of this presentation, participants will be able to:

1. Describe the challenges of adults experiencing homelessness in managing diabetes.
2. Identify the significance of hemoglobin A1c measurement and adherence to standards of care for this population.

Needs of Homeless Adults

• 553,742 individuals were homeless on a single day in the U.S. in 2017
• Adults experiencing homelessness have high rates of acute and chronic illness and have difficulty accessing resources
• Mental illness and impaired thinking due to substance abuse may be present
• Lack of insurance and access to primary care may cause individuals to rely on emergency departments and hospitalizations
• Nearly 40% of homeless adults have vision impairments
Diabetes in Homeless Adults

- Homeless adults may be unaware that they have diabetes, increasing the potential for health complications
  - Barriers to diabetes management in homelessness:
    - Diet & food insecurity
    - Limited access to care
    - Inability to pay for medications
    - Lack of a safe place to store medications
    - Chaotic lifestyle
    - Competing priorities for limited income
    - Stress

Purpose

The purpose of this study was to explore diabetes in adults experiencing homelessness by evaluating diabetes risk, A1c measurement, and achievement of the goals of the American Diabetes Association (ADA) Standards of Medical Care in diabetes.
Methods

Project Homeless Connect Omaha (PHCO):

• The purpose of PHCO is to meet immediate needs of those experiencing homelessness, identify potential future needs, and provide a connection with community resources
• University-sponsored
• Faculty, staff, and student volunteers
Instruments

1. Screening test “Are You at Risk for Developing Type 2 Diabetes?” for asymptomatic adults
2. Hemoglobin A1c measurement
3. ADA Standards of Medical Care for diabetes

Order of Events

- PHCO Event: 481 participants attended PHCO
- “Are You At Risk?” Screening Tool: All 481 participants filled out this self-report screening tool
- A1C Testing: 91 participants scored 5 or greater on the previous tool and underwent A1C testing
- Standards Of Care Screening Tool: 40 participants had A1C levels indicative of prediabetes or diabetes and filled out this second self-report screening tool
“Are You At Risk?” screening tool

1. How old are you?
   - Less than 40 years (0 points)
   - 40–49 years (1 point)
   - 50–59 years (2 points)
   - 60 years or older (3 points)

2. Are you a man or a woman?
   - Man (1 point)
   - Woman (0 points)

3. If you are a woman, have you ever been diagnosed with gestational diabetes?
   - Yes (1 point)
   - No (0 points)

4. Do you have a mother, father, sister or brother with diabetes?
   - Yes (1 point)
   - No (0 points)

5. Have you ever been diagnosed with high blood pressure?
   - Yes (1 point)
   - No (0 points)

6. Are you physically active?
   - Yes (0 points)
   - No (1 point)

7. What is your weight category?
   - See chart at right.

Hemoglobin A1c Measurement

- Evaluates glycated hemoglobin
- Identifies average plasma glucose concentration over 3-month period
- Point-of-care machines which deliver results in 6 minutes (not meant to be fully diagnostic but serve as screening tool)
- Ranges (according to the ADA):
  - Normal = <5.7%
  - Pre-diabetes = 5.7% -- 6.4%
  - Diabetes = >6.4%
ADA Standards of Care

<table>
<thead>
<tr>
<th>Medical standard</th>
<th>Goal</th>
<th>Goal Met</th>
<th>Medical standard</th>
<th>Goal</th>
<th>Goal met</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1c</td>
<td>&lt; 7%</td>
<td>Extremities - Neuropathy</td>
<td>Annual foot exam, daily checks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Today's result:</td>
<td>5MBG: FBG goal &lt; 130mg/dL</td>
<td>2 hr PP goal &lt; 180mg/dL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lipids</td>
<td>if &gt; 40 yo, on statin therapy (at least moderate intensity) Annual monitoring</td>
<td>Blood Pressure</td>
<td>&lt; 130/80</td>
<td>On ACE-I/ARB if proteinuria* (otherwise thiazide or CCB)</td>
<td></td>
</tr>
<tr>
<td>Urine</td>
<td>Annual ACR, goal &lt; 30mg/g</td>
<td>ASA use</td>
<td>&gt; 50 yo with &gt; 10% ASCVD risk = 81mg daily dose</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cigarette/Tobacco use</td>
<td>None</td>
<td>Immunizations</td>
<td>Annual influenza</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ophthalmic</td>
<td>Annual eye exam</td>
<td>Pneumovax once before 65 yo, once after</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medication Adherence/Access Issues?</td>
<td></td>
<td>Prevnar once after 65 yo</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hep B if &lt; 60 yo</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

Results

478 participants completed “Are You at Risk?” screening tool
- 51 out of the 478 were determined to be "at risk"
- 12 participants reported previous diabetes diagnosis
- 28 participants requested to complete A1c testing

91 total participants completed A1c testing
- 4 (4%) at the diabetes station were newly diagnosed with diabetes
- 29 (32%) had elevated A1C levels demonstrating prediabetes
- 6 of 12 who had been previously diagnosed had elevated levels between 7.3% to >13%, indicating poor glycemic control and diabetes management
Characteristics of 91 participants

<table>
<thead>
<tr>
<th>Gender</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>26</td>
<td>29</td>
</tr>
<tr>
<td>Male</td>
<td>62</td>
<td>68</td>
</tr>
<tr>
<td>Missing data</td>
<td>3</td>
<td>1</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Race</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>White (not Hispanic/Latino)</td>
<td>45</td>
<td>49</td>
</tr>
<tr>
<td>Black or African American</td>
<td>24</td>
<td>26</td>
</tr>
<tr>
<td>White (Hispanic/Latino)</td>
<td>17</td>
<td>19</td>
</tr>
<tr>
<td>Native Americans</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Missing data</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>A1C screening</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤5.6% (38 mmol/mol)</td>
<td>52</td>
<td>57</td>
</tr>
<tr>
<td>5.7% to 6.4% (39 to 46 mmol/mol)</td>
<td>29</td>
<td>32</td>
</tr>
<tr>
<td>≥6.5% (48 mmol/mol)</td>
<td>10</td>
<td>11</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Range</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, y</td>
<td>26-82</td>
</tr>
</tbody>
</table>

Percentage of participants with diabetes or pre-diabetes (N=40) meeting standards of care

<table>
<thead>
<tr>
<th>ADA Standard</th>
<th>% of Participants Meeting Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lipid management</td>
<td>37.5</td>
</tr>
<tr>
<td>Urine protein screening</td>
<td>12.5</td>
</tr>
<tr>
<td>Tobacco use</td>
<td>42.5</td>
</tr>
<tr>
<td>Eye examination</td>
<td>27.5</td>
</tr>
<tr>
<td>Foot screening completed by health care provider</td>
<td>30</td>
</tr>
<tr>
<td>BP</td>
<td>50a</td>
</tr>
<tr>
<td>Aspirin use</td>
<td>46.4b</td>
</tr>
<tr>
<td>Dental screening</td>
<td>32.5</td>
</tr>
<tr>
<td>Influenza immunization</td>
<td>45</td>
</tr>
<tr>
<td>Any pneumonia vaccine</td>
<td>42.5</td>
</tr>
</tbody>
</table>
Standards of Care Goals Met (N=40)

• 5 (12%) had achieved all 10 standards
• 10 (25%) had achieved 4-8 standards
• 25 (63%) ≤ 3 standards

• Participants consistently identified eye, foot, and dental exams, lipid management, and urine protein screening as areas where ADA standards were not achieved

Conclusions

• Diabetes is poorly managed among adults experiencing homelessness and requires a focus of increased education and access to health care measures
• Individuals in this population are not receiving the care they need to limit the progression of their diabetes to acute and chronic complications
• Individuals in this population who have diabetes or pre-diabetes are at increased risk for cardiovascular disease, diabetic retinopathy, nephropathy, neuropathy, and diabetic foot ulceration
Recommendations

- It is recommended that the results from the PHCO event serve as a launch pad to:
  - increase the number of free health outreach events
  - increase the number of free clinics
  - provide teaching sessions regarding diabetes at homeless shelters
  - increase awareness of these needs in health professionals and students

Recommendations

- Involve a diabetes educator
- Engage a peer leader, who has experienced homelessness and also has a diagnosis of diabetes
- Connect individuals experiencing homelessness with these resources at PHCO
- Educational classes on diabetes management provided by the diabetes educator and peer leader in homeless shelters in the area
Limitations

- Tools were self-report and some participants may not have accurate information on their personal health history or family history
- Health professions students were the ones performing the risk assessment, completing tests, gathering data on standards of medical care, and providing education on gaps in care, making it difficult to ensure interrater reliability
- This event is only held on one day at one location in the Midwest. Adults experiencing homelessness in other geographical area may differ in some significant way, limiting the generalizability of the results

References

Questions & Comments?

Thank you for attending!